SCDHEC *Earth Today*

Lesson Grade Level: 6

Lesson Title: Why Do We Need Hybrid Cars?

SC State Science Standard(s):

(I, B, 1, a) Identify a specific need for a product.

(I, B, 1, b) Determine whether the product will meet the needs and be used.

Segment Link:

In the first part when the people are discussing hybrid cars.

Lesson Overview:

This is a post-video discussion that allows students to focus their thoughts on the need for the electric car options present in the video. You may use this to explore the topics of fossil fuels, pollution and alternative fuels to your class.

Background:

Fossil fuels are used in almost every aspect of our lives. They are used by many states to produce the electricity to power our homes, schools and businesses. They are used by our vehicles to transport people and goods around the nation and world, not just for our cars, but also our ships and airplanes. Two of the by-products of fossil fuel use are nitrogen oxide (NOX) and volatile organic compounds (VOCs) which combine to form ozone (ozone is helpful up high in the atmosphere, but near the surface, it causes health problems). NOX also produced by cars combines with moisture in the air to form components of acid rain, NOX and sulfur dioxide (SO_2). The burning of fossil fuels also releases high amounts of sulfur into the air which adds to smog. However, current automobiles use gasoline since it has traditionally been cheaper and more efficient than electric cars. However, with the increasing demand for a cleaner environment, the price of gasoline has gone up to pay for additives that are supposed to bring pollution down. Certain states have also mandated emissions standards to lower the amount of pollution cars produce, which has made car owners pay more for making their cars environmentally friendly. More recently, the cost of gasoline has also increased due to production demands. One final problem associated with fossil fuels is that their supply is finite. As the name implies, "fossil" means they are the result of the decayed and altered body parts of plants and animals from millions of years ago. They take a long time to develop. We are using them at a rate far faster than they are naturally being produced. This has increased the demand for an alternative to costly, polluting fuel.

Lesson Plan:

1. After watching the video, students will list the many uses of fossil fuels. Then, they will discuss some of the problems associated with the use of fossil fuels for energy. Afterwards, they will come up with ideas about how these problems could be avoided or at least minimized (nuclear power, solar energy, hydroelectric power, wind power, geothermal power, synthetic fuels). Students will need to also list the limitations these alternatives have.

Additional Teacher Background:

There are vehicles available today that reduce air pollution and increase fuel economy! Manufacturers are making several types of vehicles that either use alternative fuels, an

electric motor or an internal combustion/electric motor. Here are a few of the different types of alternative vehicles available now:

Hybrid/Electric Vehicle (HEV) – combination of an internal combustion engine and an electric motor. Advantages to driving an HEV:

- Twice the fuel economy of a conventional vehicle.
- Lower emissions and better for the environment.
- Uses regular gasoline, does not have to be plugged in and it recharges itself!

Electric Vehicle (EV) – totally electric vehicle that is powered by fuel cells and does require a charge. Advantages to driving an EV:

- The wait time to recharge a battery is not as long as it used to be.
- Total fuel economy, because gas is not necessary!
- An EV's contribution to air pollution is virtually zero, which is the best option for cities with high concentrations of air pollution.

Alternative Fuel Vehicle (AFV) – vehicle that uses an alternative fuel source other than petroleum. Advantages to driving an AFV:

- Better for the environment because it reduces the emissions of ozone and smog forming pollutants.
- Alternative fuels reduce the dependency on foreign oil.
- Some alternative fuels come from corn, soybean and other products, which increases the demand for these types of agricultural crops.

For more information on, hybrid/electric vehicles, electric vehicles and alternate fuel vehicles visit these websites:

www.epa.gov/otaq/fuels.htm
www.fueleconomy.gov
www.energy.gov/transportation/sub/altfuel.html